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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,601	02/19/2002	Xiaoming Ren	107044-0013	5541
24267	7590	02/18/2004	EXAMINER	
CESARI AND MCKENNA, LLP 88 BLACK FALCON AVENUE BOSTON, MA 02210			ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER

1745

DATE MAILED: 02/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary

Application No.

10/078,601

Applicant(s)

REN ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 37-84 is/are pending in the application.
- 4a) Of the above claim(s) 47-54, 59-61, 64, 67 and 74-84 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 37-46, 55-58, 62, 63, 65, 66 and 68-73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 May 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 IDS.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I (claims 37-46, 55-58, 62-63, 65-66 and 68-73) in Paper No. 12/18/03 is acknowledged.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 05/08/02, 10/09/02, 03/13/03 and 06/17/03 were considered by the examiner.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 24, 32, 5, 16, 40, 61, 848, 849, 930. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "30" has been used to designate both the separator and the gas permeable layer. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "10" has been used to designate both the cathode face per se and the catalyst (See pages 8-9). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "740" has been used to designate both the single conduit and the methanol conduit (See Figure 7B). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

7. The disclosure is objected to because of the following informalities: the current status (i.e. whether abandoned or patented) of all copending US applications recited in the specification must be included (e.g. see pages 10 and 16). Appropriate correction is required.

8. The use of the trademark "Nafion" has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

9. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed

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150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

10. Claim 37 is objected to because of the following informalities: the present claim recites the limitation "an anode chamber" two times (lines 4 and 7). Thus, since the claim itself contains an earlier recitation of said limitation, it would be unclear to determine whether more than one anode chamber is intended to be recited. Appropriate correction is required.

11. Claim 38 is objected to because of the following informalities: the present claim recites the limitation "said liquid-closed volume" (line 2). This limitation has insufficient antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claim 42 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

14. Claim 42 is indefinite as it appears to be a dependent claim but it lacks dependency. *For purpose of prosecution, claim 42 has been construed as depending from independent claim 37.*

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

16. Claims 37-46, 55-58, 62, 63, 65, 66 and 68-73 are rejected under 35 U.S.C. 102(e) as being anticipated by Corey et al 2002/0172851.

The present claims are drawn to a direct oxidation fuel cell wherein the claimed inventive concept comprises the specific anode chamber configuration and gas effluent release port.

With respect to claim 37, 44-46, 55-56, 62-63:

Corey et al disclose a direct oxidation fuel cell system 20 (DMFC) including a membrane electrolyte assembly 22 having a proton-conducting, electronically non-conductive membrane electrolyte 26 disposed between an anode chamber 22 and a cathode chamber 24 (SECTION 0039). Each surface of the membrane electrolyte 26 is coated with electrocatalysts which serve as anode reactive sites 23 on the anode chamber side of the membrane and cathode reactive sites 25 on the cathode chamber side of the membrane, thereby, facilitating the electrochemical reactions of the DMFC (SECTION 0039). Diffusion layers 27 and 28 may be included and positioned on either side of the membrane and provide a uniform effective supply of methanol solution to the anode reactive sites (SECTION 0041). It is disclosed that fuel cells generate electricity through electrochemical reactions (SECTION 0004) and they have a circuit

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connecting the anode chamber and the cathode chamber through an external electrical load (SECTION 0009 & 0043).

Corey et al further disclose, *in particular*: that the effluents could be removed by venting the carbon dioxide out of the anode chamber (SECTION 0014); as well as an effluent gas produced in an anode chamber of a fuel cell is collector and then exhausted through a cathode chamber of the fuel cell (SECTION 0020); having the carbon dioxide produced from the oxidation of fuels not directly exhausted from the fuel cell system but, instead, used to remove/recirculate effluent water in the cathode (SECTION 0017); and the fuel cell including a proton conducting membrane electrolyte separating the chambers and having an effluent gas-permeable portion allowing effluent gas produced in said anode chamber to flow into the cathode chamber (SECTION 0026).

Figure 5 below depicts a passive control system using gas produced in the anode chamber for removing water from the reactive sites in the cathode chamber (SECTION 0085).

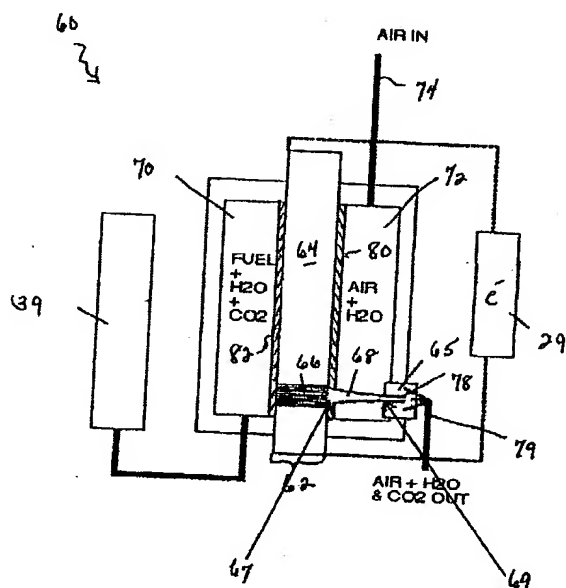


FIG. 5

As apparent from Figure 5 and Corey et al's disclosure of SECTIONS 0014, 0017 and 0020), this fuel cell system: i) can be provided with a gaseous effluent port located in the anode chamber in close proximity to the anode side of the membrane electrolyte; and ii) does not have any liquid exit port in the anode chamber per se. Thus, it has a liquid closed volume anode chamber, and no anode liquid recirculation. These features act as a gaseous anodic product removal component. This structure also encompasses the absence of any water external pumping and/or active water removal element.

As previously mentioned, the fuel cell system of **Figure 5** above represents a passive fuel cell system (SECTION 0085). *Thus, it operates without external pumping of cathodically-generated water and without active water removal elements.*

With respect to claims 38-39, 57-58 and 68-71:

Corey et al teach the use of methanol (SECTIONS 0007, 0009, 0011) as well as the addition of another liquid such as water (SECTION 0009, 0041, 0043 & FIGURE 5). It is also disclosed that in a DMFC system, an aqueous methanol solution, preferably a solution greater than 0 to about 100 % methanol by volume can be used (SECTION 0043).

With respect to claim 38 and 40:

As apparent from Figure 5 and Corey et al's disclosure of SECTIONS 0014, 0017 and 0020 and 0026, this fuel cell system: i) can be provided with a gaseous effluent port located in the anode chamber in close proximity to the anode side of the membrane electrolyte; and ii) does not have any liquid exit port in the anode chamber per se. Thus, it does have a liquid closed volume anode chamber, and no anode liquid recirculation.

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With respect to claims 41 and 43:

Corey et al disclose that the carbon dioxide produced from the oxidation of fuels is not directly exhausted from the fuel cell system but, instead, used to remove/recirculate effluent water in the cathode (SECTION 0017); and the fuel cell including a proton conducting membrane electrolyte separating the chambers and having an effluent gas-permeable portion allowing effluent gas produced in said anode chamber to flow into the cathode chamber (SECTION 0026). *Thus, this implies that the water produced at the cathode is not collected or redirected to the anode, in fact, the anode effluent is being employed to remove such water out of the fuel cell system. Thus, a portion of the anode chamber is gas permeable.*

With respect to claims 42-43:

Corey et al further disclose that the effluents could be removed by venting the carbon dioxide out of the anode chamber (SECTION 0014);

With respect to claim 65:

Reference numeral 39 is a fuel supply cartridge and represents the external fuel source (SECTION 0080).

With respect to claims 66 and 72-73:

It is disclosed the establishment of low pressure regions adjacent the outlet in the anode chamber (SECTION 0026, 0088). *Thus, a pressure differential does exist between the fuel in the fuel source and the anode chamber. Accordingly, it is noted that this pressure differential effectively creates suction conditions in the anode chamber.*

Thus, the claims are anticipated.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282.

The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
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A handwritten signature in black ink, appearing to be 'RAM', with a horizontal line extending to the right from the bottom of the signature.